EPA Region 7 TMDL Review

TMDL ID: KS-MO-08-LM073001 **State:** KS
Document Name: PONY CREEK LAKE PHASE II

Basin(s): MISSOURI
HUC(s): 10240008
Water body(ies): PONY CREEK LAKE
Tributary(ies): PONY CREEK
Pollutant(s): EUTROPHICATION, NITROGEN, PHOSPHORUS

Submittal Date: 9/5/2007 **Approved:** Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

The TMDL was officially submitted for approval in a letter from the Kansas Department of Health and Environment (KDHE) received by the United States Environmental Protection Agency (EPA), Region 7 on September 5, 2007. A revised version of the TMDL was received as an email attachment on October 26, 2007. This submittal is a phase II TMDL with the first phase approval of a document submitted on June 28, 2001.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

The submittal identifies nitrogen and phosphorus as responsible for growth of objectionable concentrations of algae which is linked to eutrophication. Nitrogen to phosphorus and phosphorus to chlorophyll ratios are used to determine which nutrient is limiting. As a result of this analysis algal growth is either co-limited (both nitrogen and phosphorus) or phosphorus limited. The submittal identifies LCs of 1,057 and 14,553 pounds/year for phosphorus and nitrogen, respectively, to achieve a chlorophyll concentration of 10 ug/L. This will require a reduction of 51 and 55% for nitrogen and phosphorus loads, respectively.

EPA agrees that attainment of the LCs should result in the attainment of WQS.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Pony Creek Lake's eutrophication impairment is addressed through a narrative nutrient WQS. This standard states the introduction of plant nutrients into streams, lakes, or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life (KAR 28-16-16-28e(c)(2)(A)).

Additionally, the introduction of plant nutrients into surface waters designated for primary or secondary contact recreation use shall be controlled to prevent the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating, or emergent aquatic vegetation (KAR 28-16-28e (c)(7)(A)).

Assigned beneficial uses for Pony Creek Lake are; Primary Contact Recreation; Expected Aquatic Life Support; Domestic Water Supply; Food Procurement; Industrial Water Supply; Irrigation Use; and Livestock Watering Use. The submittal states that all uses are impaired by eutrophication.

Numeric criteria for nitrogen and phosphorus are derived through the use of the CNET lake model and Carney Nitrogen Models. The target chlorophyll concentration of 10 ug/L was used to derive the required nitrogen and phosphorus concentration in the lake. The models estimate present loads and target loads to reach the target chlorophyll concentration.

This phase II TMDL uses data from the phase I TMDL as well as subsequent sampling results to more accurately define present conditions in the lake. The re-evaluation has resulted in a better evaluation of the lake's condition and response of the algal community to nutrient conditions.

EPA agrees that the phase II TMDL results in an improved analysis and more appropriate LCs.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

The submittal uses a chlorophyll target of 10 ug/L as a surrogate numeric criterion for the narrative standards dealing with eutrophication. This is a reduction from the phase I TMDL which targeted 20 ug/L of chlorophyll. Chlorophyll concentrations are generally accepted measures of eutrophication in lakes and reservoirs and has often been accepted by EPA as such.

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In phase II KDHE uses an expanded data set to make loading and LC estimates which are more refined. In phase I the phosphorus LC was set at 3,353.2 pounds/year with a current load condition estimated at 19,596.7 pounds/year. The refined analysis in phase II estimates the current load at 2,355 pounds/year and sets the LC at 1,057 pounds/year. For nitrogen the current load and LC for phase I were 29,414.6 and 14,553 pounds/year and for phase II these remain the same.

The new phosphorus loading estimates were used with the CNET model to set a LC to target a chlorophyll concentration of one half that in the phase I TMDL.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

The land use distribution for Pony Creek Lake's watershed is 40% row crop and small grains, 29% pasture and hay, 14% native grassland, 7.5% forest, 6.2% developed, and the remainder in wetlands, open water, and urban grasslands. There are two active animal feeding operations located completely within the watershed and one adjacent, a portion of with is located in the watershed (A-MONM-BA02, A-MONM-BO01, and A-MONM-SO66 (partially in watershed)). The combined permitted capacities is 1,780 animal units. These are state

permitted facilities and do not have a National Pollution Discharge Elimination System (NPDES) permit because of their small size.

Nonpoint source loading from crop and grasslands with fertilizer applications is recognized as the major source of nutrient loading to the lake. Additional nonpoint sources include storm water runoff from the City of Sabetha and the local golf course. The mean soil permeability is given as 0.46 inches/hour. The submittal also identifies septic systems both in and outside of Sabetha. The City of Sabetha's 2000 population was 2,589 with a growth projection suggesting a slight increase by 2030.

Natural background sources are identified as leaf litter, wastes from wildlife, atmospheric and geological formations.

Phase II gives a more refined breakdown of land use types and animal facilities in the watershed. It also describes soil permeability which indicates when surface runoff will occur. The golf course source is also new to the Phase II TMDL.

EPA agrees the submittal considers all known significant sources.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2 (i)]. If this is a phase II TMDL the change in LC will be documented in this section.

The LC for Pony Creek Lake is given as 1,057 and 14,553 pounds/year for phosphorus and nitrogen respectively. This calculates to daily maximums of 6.92 and 106.9 pounds/day using the Technical Support Document for Water Quality Based Toxics Control (EPA/202/2-90-001) method.

A statement is presented in the TMDL expressing that the growing season mean target is more correctly determined by nutrient loading on an annual basis because of the way a lake functions ecologically.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

No discharging NPDES permitted facilities were identified in the watershed. Animal feeding operations in the watershed are not NPDES permitted, the state permit assigns a zero load to the facilities. The sum WLA is set at zero (0). This WLA has not changed from the Phase I TMDL.

EPA agrees this is an appropriate WLA.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

For phosphorus the LA is set at 6.23 pounds/day or 951 pounds/year. For nitrogen the LA is set at 96.2 pounds/day or 13,098 pounds/year.

These LAs are a refinement from Phase I. The phosphorus LA has been reduced from 3,018 pounds/year in Phase I, while the nitrogen LA has remained the same. This is the result of more extensive modeling in Phase II.

EPA agrees this is an appropriate LA.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is

implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

The MOS is explicit for both phosphorus and nitrogen, set at 10% of the LC. For phosphorus is it 0.69 pounds/day or 106 pounds/year. For nitrogen it is 10.7 pounds/day or 1,455 pounds/year. The Phase I TMDL also used a 10% MOS so there is no change in the method of calculation of the MOS.

EPA agrees that these are appropriate explicit MOSs.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

The targeted chlorophyll concentrations are expressed as summer means. This is the growing season and coincides with the recreation season. The targeted phosphorus and nitrogen loads are calculated on an annual basis to achieve the targeted chlorophyll concentrations through the use of a growing season water quality model.

Seasonality and any critical conditions have been addressed in the submittal.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

Public meetings for TMDLs in this basin have been held since 2001. The TMDLs are also available in their draft form on the KDHE web site. This TMDL was available for public comment during at least June 2007 through August 2007. A public meeting was held on May 30, 2007 in Hiawatha, KS. Basin advisory committee meetings were held on June 26, 2006; January 26, 2007; March 16, 2007; and May 14, 2007.

Comments were received from EPA on the public notice version and final review version of the Pony Creek Lake TMDL. All comments were addressed satisfactorily in the revised submittal of October 26, 2007.

EPA agrees the TMDL received the opportunity for meaningful public input.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

The lake was sampled after the phase I TMDL, the results of that sampling was used to prepare the refined analysis presented in this phase II TMDL.

Pony Creek Lake will continue to be sampled once every four years as part of KDHE rotating basin approach for assessing water bodies.

Evaluation of nonpoint control management practices will occur in 2012. Pony Creek Lake will be evaluated for delisting as part of the 2016 303(d) list based on monitoring to be conducted during the 2008-2015 time frame. This TMDL will be incorporated into the Kansas Continuing Planning Process and the Water Quality Management Plan.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

Because the WLA for this TMDL is zero, no reasonable assurances are required. The submittal does list

numerous potential state authorities to regulate point and nonpoint source pollutants in the watershed.